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(54) GRIPPER ELEMENTS FOR SPORTS SHOES

(71) I, ADOLF DASSLER, a citizen of Germany of D-8522, Herzogenaurach, Am Bannhoff, West Germany, do hereby declare the invention for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to gripper elements for sports shoes and especially for track shoes for use on plastics tracks.

The nature of the plastics tracks, for the staging of sports competitions, which have existed for some time, has brought with it certain problems in the design of the sports shoes to be used thereon. The problems relate especially to the design of the spikes or gripper elements on the sports shoes of runners, jumpers, javelin throwers and the like. One of the problems is that the track holds the spikes of track shoes very firmly after the spikes have penetrated, so that turning the shoe about an axis at right angles to the track, such as would be necessary, for example, when running round a bend, is not readily possible, and pulling the spikes out also requires a relatively high force to be exerted.

For this reason, the use of conventional spikes has been discontinued for a long time for plastics tracks and a large number of proposals has also already been made for different designs of the gripper elements or outsoles of sports shoes, in order to make these suitable for use on plastics tracks. However the existing problems have hitherto not yet been solved satisfactorily. Above all, the outstanding problem still remains to reduce the retention of the track shoes in the track by the gripper elements and thereby to reduce the high strain on the feet and legs of the sports competitors without thereby also eliminating the reliable grip and safety from slipping and the possibility of high force transfer.

According to the present invention there is provided a gripper element for a sports shoe, such as a shoe for use on plastics tracks, such gripper element comprising a body having first and second ends with a longitudinal axis extending therebetween, the second end being adapted to be secured to the outsole of a sports shoe, at least one penetrating surface of said body being generally conically or pyramidally tapered towards said first end and being provided with one or more grooves extending approximately parallel or transverse to the generatrices of the body to form at least one support surface for limiting the depth of penetration of the body into the track, and located between the penetrating surface and the second end but spaced from the second end.

According to a preferred construction the gripper element comprises a body having first and second ends with a longitudinal axis extending therebetween, the second end being adapted to be secured to the outsole of a sports shoe, a radially outer surface of said body being defined by rotating a convex line about the longitudinal axis, so that the body is narrower at the first end than at the second end, and wherein a plurality of longitudinally extending circumferentially spaced grooves are formed in the body, the depth of the grooves increasing gradually from the first end to a point approximately centrally of the first and second ends and then gradually decreasing, so that the ends of the grooves adjacent the first end form penetrating surfaces and the ends of the grooves nearer the second end form support surfaces for limiting the penetration of the body into the track.

The invention also provides a gripper element for a sports shoe, such as a shoe for use on plastics tracks, such gripper element comprising a tapered body having first and second ends with a longitudinal axis

extending therebetween, the second end being adapted to be secured to the outsole of a sports shoe, the body being narrower at the first end than at the second end, a plurality of grooves extending on the outer surface of the body in a plane perpendicular to the longitudinal axis, the faces of the grooves adjacent the second end providing support surfaces for limiting the penetration of the body into the track.

The gripper elements of the invention, when used on plastics tracks penetrates less deeply into the track and hence are also retained less than the previous gripper elements. It has been found that gripper elements of this type even in the gripped state, permit a certain turning of the shoe about an axis approximately at right angles to the track. At the same time these gripper elements can produce support against the track surface so as to generate a catapult effect and permit penetration into the track by means of sharp edges.

In order that the invention will be more fully understood, the following description is given, by way of example, reference being made to the accompanying drawings, in which:—

Figure 1 shows, in elevation a first embodiment of a gripper element according to the invention;

Figures 2a and 2b are a perspective view and a plan view respectively of a second embodiment;

Figures 3a and 3b show modifications of the embodiment according to Figures 2a and 2b;

Figure 4 is a cross-section through a further construction;

Figures 5a and 5b are a side view and axial cross-section respectively of a fifth embodiment of a gripper element;

Figures 6a and 6b are similar views of a sixth embodiment of a gripper element; and

Figure 7 is a side view of a seventh embodiment of a gripper element.

Figures 1 to 7 represent gripper elements which resemble conventional spikes in their basic concept and the way in which they are fixed.

The spike of Figure 1 consists of an originally conical body 6, which is provided, in the present case, with three grooves 8 starting from its conical surface 7. The grooves 8 begin at the apex or first end 9 of the spike 5 and extend to the base 10 of the conical part 6. As can be seen, in particular, from the broken line 11 (on the left of Figure 1), the depth of the grooves 8 gradually increases, starting from the apex 9 of the cone 6 and then decreases, somewhat more sharply, towards the base 10. As a result of this, the angle between the longitudinal axis 12 of the spike and the bottom of the groove 8, indicated by the broken line 11, increases relatively rapidly in the region of the spike which adjoins the outsole so that in this region the spike offers increased resistance to penetration into the track. Of course, the support region thus formed can be as near or far from the apex 9 of the spike as is desired. All that this requires is that the shape of the bottom 11 of the grooves 8 be chosen appropriately.

The spike 5 can, in the same way as the other spikes shown in the drawing, be fixed in the outsole of the sports shoe by means of a thread 4. For this purpose, for example, a number of notches 14 for the engagement of a corresponding key are provided on a plate 13 which terminates the threaded bolt 4 (Figure 4).

The spike or gripper element according to Figures 2a and 2b is a modification of the spike according to Figure 1, which is obtained by cutting off or flattening the apex. This produces, at the free end of the spike, a flat end surface 50 which — as can be seen from Figure 2b — is essentially triangular in shape, with slightly drawn-in sides, being defined by the bottom of the grooves 8. In this embodiment, it is thus not only the broadening bottom of the grooves 8 which serves as a support surface, but essentially also the plane 50. This plane forms edges, which act as gripper edges, with the bottom of the groove.

As can also be seen from Figure 2a, the edge 6 is formed by rotating a convex curved line about the axis of the spike, so as to be narrower at the free end. Thus the spike has the shape of a half-barrel.

The embodiments according to Figures 3a and 3b are again modifications of the spikes according to Figures 2a and 2b. According to Figure 3a, a small central spike 51 additionally projects from the flat end surface 50 and assists the gripping action of the spike on the jumping board of long-jump tracks. In the embodiment according to Figure 3b, on the other hand, the end surface 50 has a recess 52 which emphasises the sharpness of the gripper edges formed by the surface 50 with the grooves 8.

In the spike 16 of Figure 4 the penetrating surfaces 18 are triangular thus forming an end piece having the shape of a pyramid. This pyramid 18 rests on a ring, or the like, 19, the circular circumferential edge 20 of which is chosen to be of such radius that it just encloses the base surface of the pyramid 18. In the regions in which the ring 19 projects beyond the base surface of the pyramid 18, support surfaces 21 are thus formed, which project radially beyond the end piece 18. In order further to increase the gripper action of the circumferential edge 20 of the support surfaces 21, the side of the ring 19 which faces the pyramid 18, that is to say also the support surface 21, can

be so constructed that it is inclined from the circumferential edge 20 towards the longitudinal central axis 22 of the spike in the direction of the outersole, that is to say towards the threaded extension 4.

A notch 24 is provided at the edges 23 of the pyramid which would extend to the circumferential edge 20 of the ring 19. Thus, in this embodiment, the sharp edge 20 of the ring 19 effectively projects somewhat, on all sides beyond the pyramid 18.

In the spikes 25 of Figures 5a and 5b and 26 of Figures 6a and 6b the design is such that a body 29 or 30 which in total is approximately pyramidal projects, as a gripper body, beyond the ring 27 or dish 28 in which the thread 4 terminates on the track side. Preferably, this pyramid 29 or 30 is a tetrahedron.

In the embodiment according to Figures 5a and 5b, the pyramid 29 consists of a more pointed penetrating end piece 31 and an adjoining, blunter support piece 32. To improve the supporting action, notches 34 are provided between the end piece 31 and the support piece 32 in the region of the edges 33 of the pyramidal part 29. As can clearly be seen from the drawing, the lower surface 35 which here serves as a support surface, analogously to the surfaces 21 in Figure 4, is inclined downwards and towards the outsole, so that a relatively sharp edge is produced at the transition from the edge 33 to the surface 35.

The spike 26 in Figures 6a and 6b is very similar to the spike 25 in Figures 5a and 5b. It only differs from the latter in that the angle between the outer surface 36 of the spike 26 and the central axis 37 of the spike remains the same over the entire length of the pyramidal body 30. The end piece 38, analogously to the end piece 31 of Figures 5a and 5b, is again separated by notches 39, in the region of the edges 40 of the pyramidal body 30, from the part of the pyramidal body which is nearer the outsole.

In addition to the notches 39 which define the end piece 38, the spike 26 of Figures 6a and 6b also possesses further notches 41, nearer the outsole. Both the notches 39 and the notches 41 form support surfaces which present increased resistance to the penetration of the spike into the track, as compared to the resistance presented to the end piece 38. In using the spike 26, long-distance runners will generally only bring the support surfaces formed by the notches 39 into action, whilst the support surfaces formed by the notches 41 will only come into action for short-distance runners and heavier athletes, since these press the spike more deeply into the track in order thus to achieve a particularly strong catapult effect.

In order to give an idea of the actual size of the spikes, it should again be pointed out here that the free end piece 38, that is to say the distance from the apex of the spike to the transition from the bottom surface of the notch 39 into the edge 40, is about 3 mm.

The spike 42 shown in Figure 7 is based on the same principles as the spikes of Figures 5 and 6. It differs from the spike of Figures 6a and 6b in that the gripper body 43 is approximately conical in shape, with the cone 43 which forms support edges 44 or support surfaces being provided with circumferential grooves 45, which appropriately form certain undercuts corresponding to the notches 39 and 41 of the Figures 6a, 6b, so that the support surfaces 44 are inclined towards the spike axis 46 and to the outsole.

The flattened faces 47 which the spikes of Figures 5a to 6b possess have the additional advantage, over the spike of Figure 7, that they provide particularly good support in running round bends, where a relatively strong centrifugal effect can be felt. On the other hand, applications are also conceivable in which the conical embodiment of Figures 1 and 2 may be more appropriate. In particular, such spikes have the advantage that even after replacement they again automatically assume precisely the correct position.

Of course it is possible to make a series of modifications to the spikes according to the invention. In particular, the angle of inclination of the penetrating end piece and of the optionally adjoining blunter support part can be widely modified to achieve particularly favourable grip properties. The spikes according to the invention can be manufactured from the most diverse materials, preferably from hard metal but where appropriate, even of plastics. Finally, as can be seen from the drawings, the spikes need not consist of a single piece. Rather, it would also be possible to compose the spikes of several parts, for example so that the end piece has a threaded extension and at least one ring which forms at least one support surface and is sharp-edged on the side in contact with the track can be put onto the end piece and is then fixed against the outsole by means of the end piece. If, in that case, several rings of different diameter, and end pieces of different design, are used, the most diverse spikes can be composed from a few individual parts. A further possibility is that the ring 13, 27 or dish 28 in which the thread 4 terminates is also provided with a sharp outer edge, which can additionally even be serrated. Furthermore, the actual apex of the spike could also be somewhat rounded or flattened in other embodiments than those shown in Figures 2a-2b.

WHAT I CLAIM IS:—

1. A gripper element for a sports shoe, such as a shoe for use on plastics tracks, such gripper element comprising a body having first and second ends with a longitudinal axis extending therebetween, the second end being adapted to be secured to the outsole of a sports shoe, at least one penetrating surface of said body being generally conically or pyramidally tapered towards said first end and being provided with one or more grooves extending approximately parallel or transverse to the generatrices of the body to form at least one support surface for limiting the depth of penetration of the body into the track, and located between the penetrating surface and the second end but spaced from the second end.

2. A gripper element according to claim 1, wherein the body is conically tapered towards the first end and a plurality of longitudinally extending, circumferentially spaced grooves are formed in the surface of the body, the depth of the grooves increasing gradually from the first end to a point approximately centrally of the first and second ends and then gradually decreasing to form the support surfaces.

3. A gripper element for a sports shoe, such as a shoe for use on plastics tracks, such gripper element comprising a body having first and second ends with a longitudinal axis extending therebetween, the second end being adapted to be secured to the outsole of a sports shoe, a radially outer surface of said body being defined by rotating a convex line about the longitudinal axis, so that the body is narrower at the first end than at the second end, and wherein a plurality of longitudinally extending circumferentially spaced grooves are formed in the body, the depth of the grooves increasing gradually from the first end to a point approximately centrally of the first and second ends and then gradually decreasing, so that the ends of the grooves adjacent the first end form penetrating surfaces and the ends of the grooves nearer the second end form support surfaces for limiting the penetration of the body into the track.

4. A gripper element according to claim 3, wherein three grooves are provided each having a domed inner surface.

5. A gripper element according to claim 3 and 4, wherein a flat end surface extending substantially perpendicular to the longitudinal axis is provided at said first end.

6. A gripper element according to claim 5, wherein an axial spike of short axial length compared to the length of the body, extends from said flat end surface.

7. A gripper element according to claim 5, wherein a recess is formed in said flat end surface.

8. A gripper element for a sports shoe, such as a shoe for use on plastics tracks, such gripper element comprising a tapered body having first and second ends with a longitudinal axis extending therebetween, the second end being adapted to be secured to the outsole of a sports shoe, the body being narrower at the first end than at the second end, a plurality of grooves extending on the outer surface of the body in a plane perpendicular to the longitudinal axis, the faces of the grooves adjacent the second end providing support surfaces for limiting the penetration of the body into the track.

9. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figure 1 of the accompanying drawings.

10. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figures 2a and 2b of the accompanying drawings.

11. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figure 3a of the accompanying drawings.

12. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figure 3b of the accompanying drawings.

13. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figure 4 of the accompanying drawings.

14. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figures 5a and 5b of the accompanying drawings.

15. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figures 6a and 6b of the accompanying drawings.

16. A gripper element for a sports shoe constructed and arranged substantially as hereinbefore described with reference to and as illustrated in Figure 7 of the accompanying drawings.

J. A. KEMP & CO,
Chartered Patent Agents,
14, South Square,
Gray's Inn,
London WC1R 5EU.

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Sheet 1

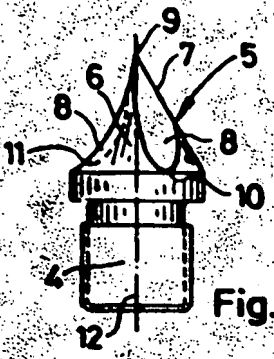

Fig. 1

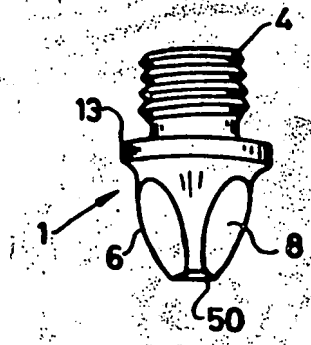

Fig. 2a

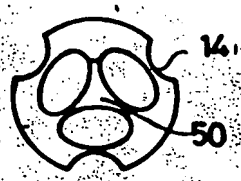

Fig. 2b

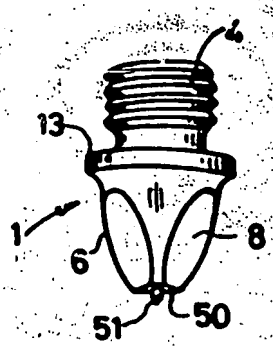

Fig. 3a

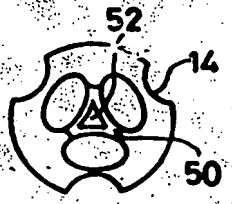

Fig. 3b

1434282 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 2

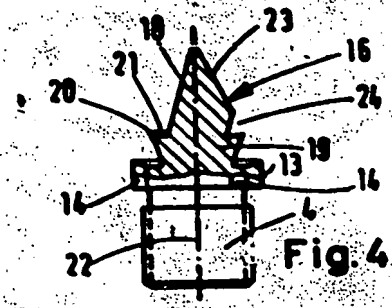

Fig.4

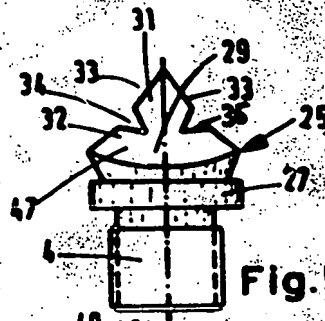

Fig.5a

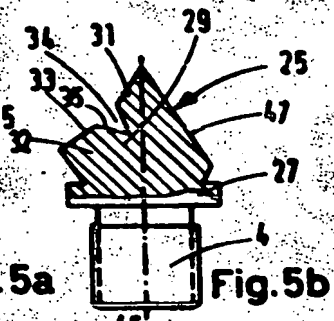

Fig.5b

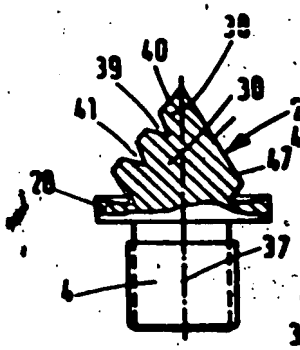

Fig.6b

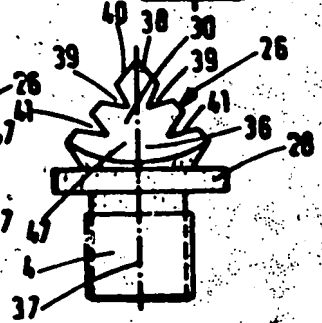

Fig.6a

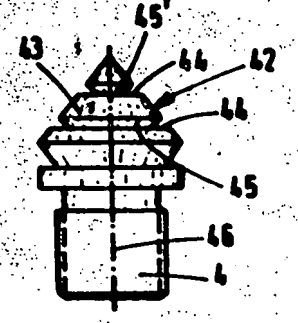

Fig.7